U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

PERIODIC BRIEFING ON NEW REACTOR ISSUES

February 20, 2008

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Executive Director for Operations

Agenda

- Overview of New Reactor Status
- Advanced Reactor Licensing Activities
- Staff Planning for Advanced Reactors

Accomplishments Since Last Briefing

- Completed acceptance reviews for AP1000, Bellefonte, Calvert Cliffs Part 1, North Anna, South Texas
- Published final Limited Work Authorization rule in the Federal Register
- Issued ESP for North Anna

Current Reviews
Design Certifications

Design	Next Milestone
AP1000	Issue RAIs – July 2008
ESBWR	Advance FSER to ACRS October 2008
EPR	Complete acceptance review 2/28/08
US-APWR	Complete acceptance review 2/29/08

Current Reviews
Combined License Applications

Bellefonte	Issue Preliminary SER and RAIs – September 2008
Lee Station	Complete acceptance review 2/25/08
Calvert Cliffs	Receive complete application 3/31/08
North Anna	Issue review schedule 2/27/08
South Texas	No dates established pending notification from applicant

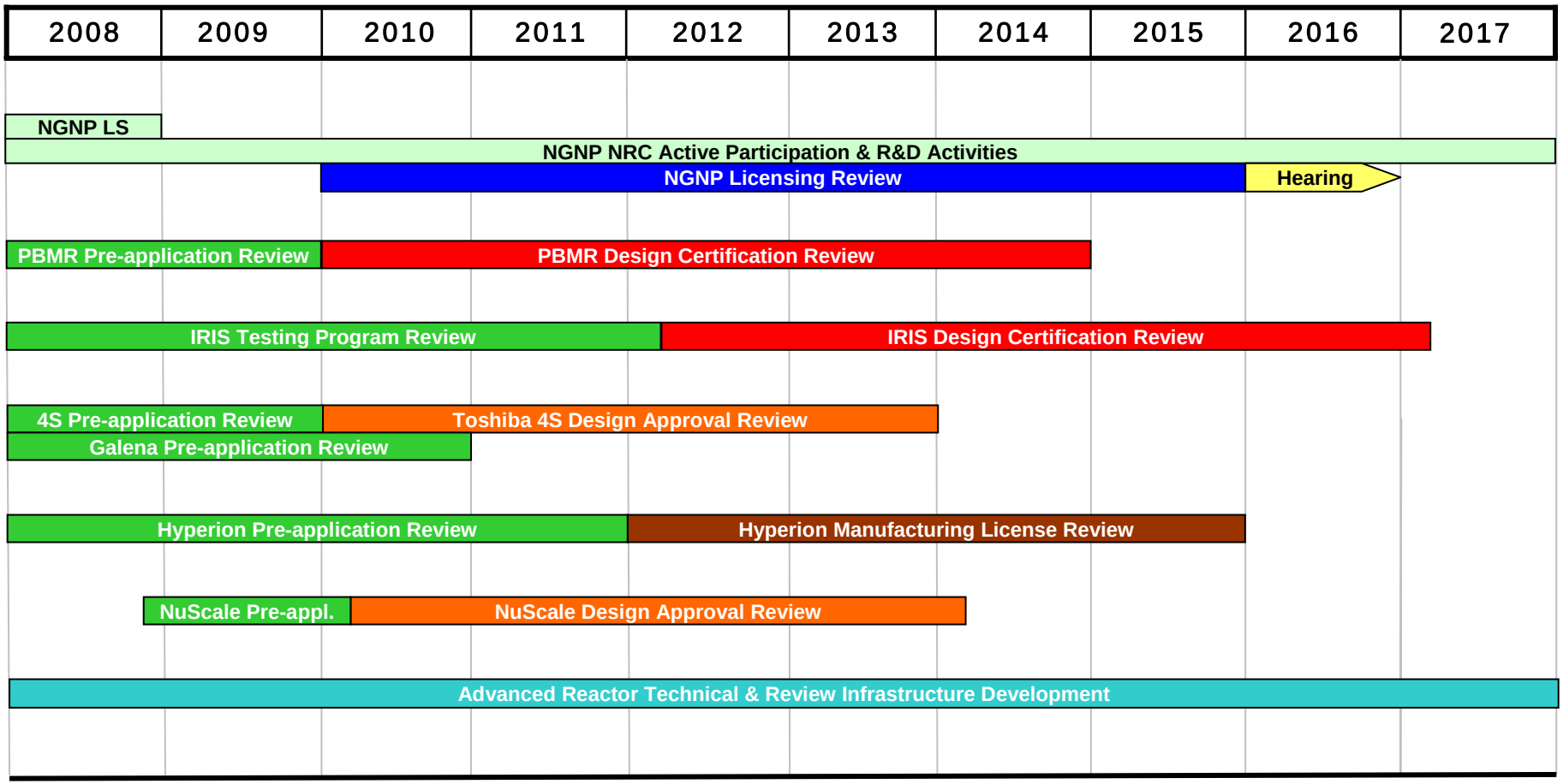
Expected COL Applications through FY2008

- South Carolina E&G – Summer
- Progress Energy – Harris
- Progress Energy – Levy County, FL
- Southern – Vogtle
- Entergy – Grand Gulf
- Entergy – River Bend
- Exelon – Victoria County
- PPL Generation – Berwick
- AmerenUE – Callaway
- TXU – Comanche Peak

Advanced Reactors Licensing Activities

Potential Advanced Reactor Licensing Applications

An estimated schedule by Fiscal Year (October through September)



Legend:

NGNP Activities	NGNP Licensing Review	Design Approval	Hearing
Pre-application Review	Manufacturing License	Design Certification	R&D/Infrastructure Development

NOTE: Schedules depicted for future activities represent nominal assumed review durations based on submittal time frames in letters of intent from prospective applicants. Actual schedules will be determined when applications are docketed.

Challenges

- Commission policy on priorities - domestic partner requirement
- Congressional direction to accelerate Next Generation Nuclear Plant
- FY 2008 and FY 2009 budget for advanced reactors
- Hiring/developing knowledgeable staff and contractors
- Developing regulatory infrastructure

Advanced Reactor Program – Project Management Infrastructure

- Separate from ongoing LWR licensing
- Consolidate licensing project management function in NRO for LWRs and Non-LWRs
- Office of Research continues research on technical bases and provides expertise to support licensing reviews

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Staff Planning for Advanced Reactors

February 20, 2008

Brian Sheron, Director
Office of Nuclear Regulatory Research

Outline

- Potential Applications
- NGNP
- HTGR Infrastructure Development
- Other designs
  - PBMR, Toshiba 4S, IRIS, Hyperion
- Concluding remarks

Potential Applications

Applicant	Design	MWt	Proposed DC Application	Utility Interest
Toshiba	LMR	30	2010	Galena#
PBMR, Pty, Ltd	HTGR	500-600	2010	unknown
Hyperion	other	75	2012	unknown
NuScale Power, Inc.	MASLWR	30	2008 Pre-application	unknown
IRIS	PWR	1000	2012	unknown

City of Galena Alaska

Next Generation Nuclear Plant (NGNP) Licensing Strategy

- Report to Congress
  - Aug 7, 2008
- NRC-DOE Licensing Strategy
- NRC needs for technical infrastructure development including analytical tools & data
- Resource requirements

Non-LWR Technical Infrastructure

- NRC does not currently have the technical infrastructure to support review of non-LWR reactor designs
- NRC infrastructure was developed and refined over the past 40 years for LWRs
- We need to develop similar capabilities for HTGR & LMR

Technical Tools Strategy

- Applicants are expected to conduct the R&D needed to establish the safety basis for the proposed design
- Pre-application reviews will be used to provide feedback to applicants on policy issues and needed R&D
- Staff will utilize licensee-generated information and leverage international information to the extent practical

NRC non-LWR Confirmatory Analysis

- NRC should develop independent capability to assess the safety performance of non-LWRs
  - Started development of some of the needed tools for HTGR
  - Data for code validation will be needed
- Staff will identify when NRC-funded confirmatory research is recommended

NRC HTGR Confirmatory Analysis

- Fuel performance
  - MIT Cooperative Agreement
  - DOE
  - International collaboration
- Thermal fluids & Accident analysis
  - MELCOR
  - CFD
- Nuclear analysis
  - PARCS

NRC HTGR Confirmatory Analysis

- Materials performance
  - High temp materials & graphite
- PRA quality and use
  - ASME developing PRA quality standard for advanced reactors
- H_2 production facility hazards analysis

NRC HTGR Confirmatory Analysis

- Data required to validate NRC codes will be obtained from existing integral test facilities, where possible
- Need for additional integral test facilities will be assessed during NGNP & PBMR pre-application reviews
  - We may need an integral facility in USA to address emerging issues

Potential Collaborations

- CSNI
- IRSN and CEA, France
- NNR, S. Africa
- European Commission (EC)
- Germany
- United Kingdom
- Japan Atomic Energy Research Institute
- China
- Universities
- Department of Energy

Other designs

- NRC Skill set and tools are lacking for LMR and hydride reactor
- With adequate resources and staff, it will take at least 5 years to develop independent capabilities for LMR
- For PBMR, RES will not be able provide independent capabilities for COL review until 2013

Concluding Remarks

- NRC could meet its commitment to support 2005 EPAct, provided:
  - DOE selects an NGNP design and operational envelope in early 2009
  - DOE accelerates NGNP technology development
  - pre-application review begun in 2010
  - policy/technical issues resolved by 2012
  - Sufficient NRC resources available

Concluding Remarks

- Implementation poses challenges to NRC
  - Developing necessary skill set & infrastructure for the review
  - Adequate funding and personnel
  - Resolve technical & policy issues
  - Interact closely with DOE and applicants to ensure adequacy of data and tools
  - Participate in international collaborations

Acronyms

- 4S: Super-Safe, Small, and Simple
- CEA: Commiserate Energies Atomique
- CFD: Computational Fluid Dynamics
- COL: Combined License
- CSNI: Committee on the Safety of Nuclear Installations
- DOE: Department of Energy
- EPAct: Energy Policy Act of 2005
- EPR: Evolutionary Power Reactor

Acronyms

- ESBWR: Economic Simplified Boiling Water Reactor
- ESP: Early Site Permit
- FSER: Final Safety Evaluation Report
- H_2: Hydrogen
- HTGR: High Temperature Gas Reactor
- IRIS: International Reactor, Innovative and Secure
- IRSN: Institut Radioprotection et Sûreté Nucléaire

Acronyms

- LMR: Liquid Metal Cooled Reactor
- LWR: Light Water Reactor
- MASLWR: Multi-Application Light Water Reactor
- MELCOR: MELCOR Severe Accident Code
- MIT: Massachusetts Institute of Technology
- NGNP: Next Generation Nuclear Plant
- NNR: National Nuclear Regulator (Republic of South Africa)

Acronyms

- PARCS: Purdue Advanced Reactor Core Simulator
- PBMR: Pebble Bed Modular Reactor
- PRA: Probabilistic Risk Assessment
- R & D: Research and Development
- RAI: Request for Additional Information
- SER: Safety Evaluation Report
- US-APWR: U.S. Advanced Pressurized Water Reactor